

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

#6
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In re the application of:

Shusuke AKAZAKI et al

Serial Number: 08/975,101

Group Art Unit:

Filed: November 20, 1997

Examiner:

For: EXHAUST GAS PURIFICATION SYSTEM OF INTERNAL COMBUSTION ENGINE

INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

February 23, 1998

Sir:

In compliance with applicants' duty of disclosure under 37 CFR 1.56, the following is material information of which applicants are aware of, and which is relevant to the above-identified application:

1. U.S. Patent No. 5,657,736
2. Japanese Laid-Open Patent Application No. Hei 4-17710
3. Japanese Laid-Open Patent Application No. Hei 5-171929
4. Japanese Laid-Open Patent Application No. Hei 6-101461
5. Japanese Laid-Open Patent Application No. Hei 8-71427

A copy of the information is attached hereto.

The applicants' comments on the above references is as follows:

United States Patent No. 5,657,736

The reference discloses a fuel metering control system for an internal combustion engine having a plurality of cylinders. The system includes an air/fuel ratio sensor and engine operating condition detecting means for detecting engine operating conditions. The basic quantity of fuel injection is determined by retrieving mapped data according to the engine speed and engine load. A controller is provided to calculate a feedback correction coefficient to correct the quantity of basic fuel injection such that variance between individual cylinder air/fuel ratios is decreased. The quantity of fuel injection is further corrected for fuel adhered to an intake manifold wall.

However, the reference does not disclose or teach the characteristic feature of the claimed invention, specifically, in which the valve which is controlled to open or close the bypass, is provided at or close to the branching point in the exhaust pipe, and a chamber is provided close to the branching point such that the conduit is connected to the bypass at the end of the chamber.

This invention, thereby, makes it possible to provide an exhaust gas purification system of an internal combustion engine which can effectively prevent the exhaust pipe from becoming clogged even if a valve for closing a bypass is struck in the closed position, further, it can provide a relatively short EGR conduit for recirculating an unburnt HC component adsorbed from the adsorber.

Japanese Laid-Open Patent Application No. Hei 4-17710

The reference discloses a purifying device of engine exhaust gas, comprising a by-

path 9, in which an adsorption device 10 comprising activated carbon is included, is provided and is in parallel with the air exhaust path in the down stream of catalysts 6 and 7. Exhaust gas is made to flow through the by-path 9 only when the temperature of the exhaust gas is the specified value or less by controlling the closing of a by-path valve 13 by means of a control unit 19. The control unit 19 controls the opening of the by-path valve 13 based on the signal relating to the sudden change of engine operation condition and shut off the flow of the exhaust gas passing through the by-pass 9 by controlling the closing of a shutter valve 14. This constitution can prevent the HC adsorbing to the adsorption device 10 from being exhaust into atmosphere. In addition, the deterioration of acceleration performance caused by the lowering of exhaust resistance and the rising of backing pressure can be prevented. With the invention disclosed in this reference, thereby, it becomes possible to prevent the exhausting of HC into the atmosphere and the deterioration of acceleration performance caused by the rising of backing pressure by shutting off the by-path, in which exhaust gas flows only when the temperature of the gas is low, based on the signal relating to the sudden change of the operating condition of an engine.

However, the reference does not disclose or teach the characteristic feature of the claimed invention, specifically, in which the valve which is controlled to open or close the bypass, is provided at or close to the branching point in the exhaust pipe, and a chamber is provided close to the branching point such that the conduit is connected to the bypass at one end of the chamber.

This invention, thereby, makes it possible to provide an exhaust gas purification

system of an internal combustion engine which can effectively prevent the exhaust pipe from becoming clogged even if a valve for closing a bypass is struck in the closed position, further, it can provide a relatively short EGR conduit for recirculating an unburnt HC component adsorbed from the adsorber.

Japanese Laid-Open Patent Application No. Hei 5-171929

The reference discloses an exhaust emission control device for an internal combustion engine, wherein when catalyst 14 is cold at the time of starting an engine 11 or the like, a flow passage changing valve 20 is changed to a position where an exit part of the catalyst 14 and a first branch passage part 15 only communicate with each other. A flow passage switching valve 21 is also released at the same time. Exhaust is purified in the catalyst 14, while the unburnt gas in unpurified exhaust is guided through the first branch passage part 15 to the adsorption material 17 to be trapped. In the meanwhile, after the catalyst 14 is heated and activated, the flow passage changing valve 20 is changed to the position where the exit of the catalyst 14, and both of the first and second branch passage parts 15, 16 communicate with each other. Simultaneously, the flow passage switching valve 21 is closed. An exhaust heat quantity for heating the catalyst 14 can thus be secured sufficiently, and the unburnt gas only can be trapped by the adsorption material 17 effectively.

The invention disclosed in this reference, thereby, makes it possible to activate catalyst speedily, and effectively trap unburnt gas only with adsorption material by disposing a passage part for having the unburnt gas adsorption material in an exhaust

passage downstream of the catalyst.

However, the reference does not disclose or teach the characteristic feature of the claimed invention, specifically, in which the valve which is controlled to open or close the bypass, is provided at or close to the branching point in the exhaust pipe, and a chamber is provided close to the branching point such that the conduit is connected to the bypass at one end of the chamber.

This invention, thereby, makes it possible to provide an exhaust gas purification system of an internal combustion engine which can effectively prevent the exhaust pipe from becoming clogged even if a valve for closing a bypass is struck in the closed position, further, it can provide a relatively short EGR conduit for recirculating an unburnt HC component adsorbed from the adsorber.

Japanese Laid-Open Patent Application No. Hei 6-101461

The reference discloses an exhaust gas purifying device for an internal combustion engine, comprises first and second branch pipes 8 and 9, joined together again after an exhaust gas pipe is branched in a two-way from a position situated downstream from a catalyst 6 located in an exhaust gas pipe 3, are provided and an activated coal converter 10 is disposed in the second branch pipe 9, a first EGR pipe 13, branched from the second branch pipe 9 situated downstream from the activated coal converter 10 and running to an intake air system, a second EGR pipe 20 branched from the second branch pipe 9 situated upper system from the activated coal converter 10 and running through a canister 9 to the intake air system, and an EGR valve 15 to control a flow rate of exhaust gas flowing

through the EGR pipes 13 and 20, further, a flow passage switching means (on-off valves 26, 27, and 28) is provided for being selectively switched to a flow passage wherein exhaust gas passing through the catalyst 6 flows through the second branch pipe 9 and is exhaust gas passing the catalyst 6 flows through the first branch pipe 8 and is exhaust through the exhaust gas pipe 3 and flows through the first and second EGR pipes 13 and 20.

The invention disclosed in this reference, thereby, makes it possible to improve operation to purify unburnt HC and to improve purge performance of a canister to adsorb vaporized fuel, in an internal combustion engine.

However, the reference does not disclose or teach the characteristic feature of the claimed invention, specifically, in which the valve which is controlled to open or close the bypass, is provided at or close to the branching point in the exhaust pipe, and a chamber is provided close to the branching point such that the conduit is connected to the bypass at the end of the chamber.

This invention, thereby, makes it possible to provide an exhaust gas purification system of an internal combustion engine which can effectively prevent the exhaust pipe from becoming clogged even if a valve for closing a bypass is struck in the closed position, further, it can provide a relatively short EGR conduit for recirculating an unburnt HC component adsorbed from the adsorber.

Japanese Laid-Open Patent Application No. Hei 8-71427

The reference discloses a catalyst for purification of exhaust gas, wherein a catalyst

11 made of a mixture of a crystalline aluminosilicate with a catalytic element is carried on a honeycomb body 2. The crystalline aluminosilicate has an irregular crystal structure formed by lacking part of the constituent elements of a crystalline aluminosilicate having a regular crystal structure and the single lattice-volume (V_1) of the irregular crystal structure calculated from the crystal lattice constant by an X-ray diffraction method is made smaller than the single lattice volume (V_2) of the regular crystal structure calculated from the crystal lattice constant by an X-ray diffraction method ($V_1 < V_2$). The crystalline aluminosilicate of the catalyst 11 with stands 1,000°C and has function to adsorb hydrocarbons at low temp. as well as superior heat resistance. The catalytic element consists of Al_2O_3 particles and Pd carried on the particles.

The invention disclosed in this reference, thereby, makes it possible to obtain a catalyst having superior high-temp. durability.

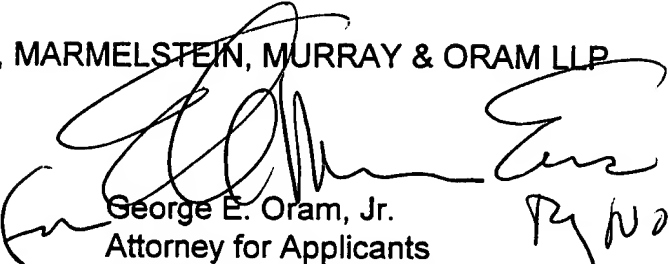
However, the reference does not disclose or teach the characteristic feature of the claimed invention, specifically, in which the valve which is controlled to open or close the bypass, is provided at or close to the branching point in the exhaust pipe, and a chamber is provided close to the branching point such that the conduit is connected to the bypass at the end of the chamber.

This invention, thereby, makes it possible to provide an exhaust gas purification system of an internal combustion engine which can effectively prevent the exhaust pipe from becoming clogged even if a valve for closing a bypass is stuck in the closed position, further, it can provide a relatively short EGR conduit for recirculating an unburnt HC component adsorbed from the adsorber.

In the event that any fees are due with this paper, please charge Counsel's Deposit
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Respectfully submitted,

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Enclosures: PTO Form 1449
5 References

Patent ☒ Trademark ☐ Docket No. P7101-7003

Serial No. 08/975,101 Filed November 20, 1997

Applicant(s) AKAZAKI et al

Papers filed herewith on February 23, 1998

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Receipt is hereby acknowledged of the papers filed as indicated in connection with the above-identified case.

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